



Dart Aerospace Ltd.
1270 Aberdeen St
Hawkesbury, ON
K6A 1K7
Canada

Tel (613) 632-5200
Fax 613 632-5246



D407-667-205TRN
Job Sheet 199412



Part No: D407-667-205TRN

Job Qty: 1 pcs

Part Name: Crosstube Turning Detail



Part Weight: 0 lbs

Status: New

Priority: Medium

Job Created: 8/22/19

Job Tracking No:

Due Date: 9/4/19

Created By: Marie Lajeunesse

Type: Stock

Description:

Note: DWG REV G IPP Rev:A 08-03-06 new issue DD verified by:ec IPP Rev B 08.04.02 Removed polish EC verified by: DD IPP Rev:C 08-08-19 revE as per dwg DD verified by:EC

Ship Via:

Bill of Materials

Job Routing

Op No	Operation	Qty	Start Date	Due Date	Standard		Workcenter/Supplier		Lead Time	Sign-off
					Setup Hrs	Run Hrs	Workcenter / Supplier			
100	Mori Seiki TL-40 - 1	1 pcs		9/4/19	1.00	3.13	Mori Seiki TL-40 - 1			DAS 66 2019/10/12 9-89
110	QC 2	1 pcs		9/4/19	0.00	0.00	QC 2 - 1			
							QC 2 - 12			
							QC 2 - 14			
							QC 2 - 17			
							QC 2 - 19			
							QC 2 - 2			
							QC 2 - 20			
							QC 2 - 22			
							QC 2 - 23			
							QC 2 - 25			
							QC 2 - 32			
							QC 2 - 33			
							QC 2 - 35			
							QC 2 - 39			
							QC 2 - 4			
							QC 2 - 40			
							QC 2 - 44			
							QC 2 - 45			
							QC 2 - 48			
							QC 2 - 49			
							QC 2 - 50			
							QC 2 - 51			
							QC 2 - 52			
							QC 2 - 57			
							QC 2 - 62			
							QC 2 - 63			
							QC 2 - 8			DAS 66 2019/10/12 9-89
							QC 2 - 66			
							QC 2 - 64			
							Plex 8/22/19 10:02 AM Dart.lajeunesse.mari			

Plex 8/22/19 10:02 AM Dart.lajeunesse.marie

					QC 2 - 65	
					QC 2 - 5	
					QC 2 - 71	
					QC 2 - 73	
					QC 2 - 69	
120	Mori Selki TL-40 - 1 - B4B	1	9/4/19	1.00 3.13	Mori Seiki TL-40 - 1 - B4B	DAS 66 2019/10/16 9-89
	pcs					
130	QC 2	1	9/4/19	0.00 0.00	QC 2 - 1	
	pcs				QC 2 - 12	
					QC 2 - 14	
					QC 2 - 17	
					QC 2 - 19	
					QC 2 - 2	
					QC 2 - 20	
					QC 2 - 22	
					QC 2 - 23	
					QC 2 - 25	
					QC 2 - 32	
					QC 2 - 33	
					QC 2 - 35	
					QC 2 - 39	
					QC 2 - 4	
					QC 2 - 40	
					QC 2 - 44	
					QC 2 - 45	
					QC 2 - 48	
					QC 2 - 49	
					QC 2 - 50	
					QC 2 - 51	
					QC 2 - 52	
					QC 2 - 57	
					QC 2 - 62	
					QC 2 - 63	
					QC 2 - 8	DAS 66 2019/10/16 9-89
					QC 2 - 66	
					QC 2 - 64	
					QC 2 - 65	
					QC 2 - 5	
					QC 2 - 71	
					QC 2 - 73	
					QC 2 - 69	
140	QC 8	1	9/4/19	0.00 0.00	QC 8 - 12	
	pcs				QC 8 - 14	
					QC 8 - 17	
					QC 8 - 20	
					QC 8 - 25	
					QC 8 - 3	
					QC 8 - 32	
					QC 8 - 33	
					QC 8 - 35	
					QC 8 - 39	
					QC 8 - 4	
					QC 8 - 44	
					QC 8 - 45	
					QC 8 - 49	
					QC 8 - 58	
					QC 8 - 8	
					QC 8 - 9	
					QC 8 - 68	

					QC 8 - 67	
					QC 8 - 1 (A)	DAS
					QC 8 - 47	47 19-10-17
					QC 8 - 40	9-89
					QC 8 - 52	
					QC 8 - 23	
					QC 8 - 57	
145 Crosstubes - 2 - B4B	1 pcs	9/4/19	0.00 0.65		Crosstubes - 1 - B4B	
					Crosstubes - 2 - B4B	
					Crosstubes - 3 - B4B	
					Crosstubes - 4 - B4B	
150 Handfinish - 1-1 Chemical-B4B	1 pcs	9/4/19	0.00 0.67		Handfinish - 1 - 1 - B4B	5/19/19-10-18 9/19-10-26
					Handfinish - 1 - 2 - B4B	
					Handfinish - 1 - 3 - B4B	
					Handfinish - 1 - 4 - B4B	
					Handfinish - 1 - 5 - B4B	
					Handfinish - 1 - 6 - B4B	
					Handfinish - 1 - 7 - B4B	
					Handfinish - 1 - 8 - B4B	
					Handfinish - 1 - 9 - B4B	
					Handfinish - 1 - 10 - B4B	
					Handfinish - 1 - 11 - B4B	
					Handfinish - 1 - 12 - B4B	
					Handfinish - 1 - 13 - B4B	
					Handfinish - 1 - 14 - B4B	
					Handfinish - 1 - 15 - B4B	
					Handfinish - 1 - 16 - B4B	
					Handfinish - 1 - 17 - B4B	
					Handfinish - 1 - 18 - B4B	
					Handfinish - 1 - 19 - B4B	
					Handfinish - 1 - 20 - B4B	
					Handfinish - 1 - 21 - B4B	
					Handfinish - 1 - 22 - B4B	
160 QC 7	1 pcs	9/4/19	0.00 0.00		QC 7 - 10	
					QC 7 - 13	
					QC 7 - 14	
					QC 7 - 15	
					QC 7 - 17	
					QC 7 - 18	
					QC 7 - 19	
					QC 7 - 2	
					QC 7 - 28	
					QC 7 - 3	
					QC 7 - 30	
					QC 7 - 34	
					QC 7 - 36	
					QC 7 - 37	
					QC 7 - 41	
					QC 7 - 47	
					QC 7 - 48	
					QC 7 - 51	
					QC 7 - 58	
					QC 7 - 59	
					QC 7 - 60	
					QC 7 - 9	
					QC 7 - 68	
					QC 7 - 50	
					QC 7 - 67	
					QC 7 - 40	
						DAS
						76 9/11/1
						9-89

170 Packaging 3-1 - Stock - B4B	1 pcs	9/4/19	0.00 0.00	QC 7 - 24	
				QC 7 - 43	
				QC 7 - 61	
				QC 7 - 81	
				Packaging 3 - 1 - B4B	
				Packaging 3 - 2 - B4B	
				Packaging 3 - 3 - B4B	
				Packaging 3 - 4 - B4B	
				Packaging 3 - 5 - B4B	
				Packaging 3 - 6 - B4B	
				Packaging 3 - 7 - B4B	
				Packaging 3 - 8 - B4B	
				Packaging 3 - 9 - B4B	
				Packaging 3 - 10 - B4B	
				Packaging 3 - 11 - B4B	
				Packaging 3 - 12 - B4B	
				Packaging 3 - 13 - B4B	
				Packaging 3 - 14 - B4B	
				Packaging 3 - 15 - B4B	
				Packaging 3 - 16 - B4B	
				Packaging 3 - 17 - B4B	
				Packaging 3 - 18 - B4B	
				Packaging 3 - 19 - B4B	
				Packaging 3 - 20 - B4B	
				Packaging 3 - 21 - B4B	
				Packaging 3 - 22 - B4B	
				Packaging 3 - 23 - B4B	
				Packaging 3 - 24 - B4B	DB 2019-11-1
				Packaging 3 - 25 - B4B	
				Packaging 3 - 26 - B4B	
				Packaging 3 - 27 - B4B	
				Packaging 3 - 28 - B4B	
				Packaging 3 - 29 - B4B	
				Packaging 3 - 30 - B4B	
				Packaging 3 - 31 - B4B	
				Packaging 3 - 32 - B4B	
				Packaging 3 - 33 - B4B	
				Packaging 3 - 34 - B4B	
				Packaging 3 - 35 - B4B	
				Packaging 3 - 36 - B4B	DAS
180 QC 21 - SA	1 pcs	9/4/19	0.00 0.00	QC 21 - SA - 21	21
				QC 21 - SA - 70	9-39
				QC 21 - SA - 53	NOV 01 2019

Part Op 100 - Mori Seiki CNC Lathe Large) 1-Fill tube with sand & install plugs DT8531 on both ends as per Folio FA248 3-Turn Descriptions: first side as per Folio FA248

110 - (QC2- Inspect parts off machine FAI/FAIB)

120 - (Mori Seiki CNC Lathe Large) 1-Turn second side as per Folio FA248 4-Scribe part # and batch # using vibrating stylus as per Dwg D407-667-245

130 - (QC2- Inspect parts off machine FAI/FAIB)

140 - (QC8- Inspect parts - second check)

145 - (Crosstubes) Grind off circumferential machining marks longitudinally.

150 - 1- handfinish X-TUBE INSIDE AND OUT 2- ACID ETCH X-TUBE INSIDE AND OUT. USE RED SCOTCH BRITE

160 - (QC7-Inspect Chemical Conversion Coat)

170 - Identify and stock in kanban rack

180 - (QC21- Final Inspection - Work Order Release)

Job BOM

Part / Item	Component Name	Quantity	Operation	Container
D6011-115	Crosstube Material	1 pcs (1 ea)	100-Mori Seiki TL-40 - 1	FL39400

Job Allocations				
Operation	Component Part	Required	Inventory	Allocated
100-Mori Seiki TL-40 - 1	D6011-115	1	48	0
Part Specifications				
Specifications could not be found.				

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Container No: S222129



Part: D407-667-205TRN

Job No: 199412

Serial No/Batch: S222129

Revision: G

Inspector:

Exp Date:

Instructions:

Dart Aerospace Ltd.
1270 Aberdeen Street
Hawkesbury, ON K84 1K7
CANADA
TEL.: 1 813 632-5200
Email: sales@dartaero.com
www.dartaerospace.com

Date: 10/12/19

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DART AEROSPACE LTD	Work Order:	199412
Description: Crosstube Assembly	Part Number:	D407-667-245
Inspection Dwg: D407-667-245 Rev: G		Page 1 of 2

FIRST ARTICLE INSPECTION CHECKLIST

	Inspection Sheet Drawing Dimension	Tolerance	Actual Dimension	Accept	Reject	Method of Inspection	Comments
SIDE A	2.490	+0.005/-0.000	2.493	✓		CNC-04	
	1.832	+0.005/-0.000	1.837	✓		CNC-08	
	1.838	+0.005/-0.000	1.843	✓		↓	
	1.892	+0.005/-0.000	1.897	✓			
	2.052	+0.005/-0.000	2.057	✓		CNC-04	
	2.206	+0.005/-0.000	2.210	✓		↓	
	2.521	+0.005/-0.000	2.525	✓			
	2.633	+0.005/-0.000	2.638	✓		↓	
	4.10	+/-0.030	4.115	✓		CNC-08	
	4.978	+/-0.030	4.973	✓		"	
	2.040	+0.000/-0.010	2.037	✓		CNC-08	
	0.125	+/-0.010	.129	✓		"	
	R0.063	+/-0.010	.063	✓		RG	
	R0.500	+/-0.010	.500	✓		"	
SIDE B	2.490	+0.005/-0.000	2.493	✓		CNC-04	
	1.832	+0.005/-0.000	1.837	✓		CNC-08	
	1.838	+0.005/-0.000	1.843	✓		↓	
	1.892	+0.005/-0.000	1.897	✓			
	2.052	+0.005/-0.000	2.057	✓		CNC-04	
	2.206	+0.005/-0.000	2.211	✓		↓	
	2.521	+0.005/-0.000	2.526	✓			
	2.633	+0.005/-0.000	2.638	✓		↓	
	4.10	+/-0.030	4.10	✓		CNC-08	
	4.978	+/-0.030	4.971	✓		"	
	2.040	+0.000/-0.010	2.036	✓		CNC-08	
	0.125	+/-0.010	.127	✓		"	
	R0.063	+/-0.010	.063	✓		RG	
	R0.500	+/-0.010	.500	✓		"	
	112.91	+/-0.020	112.925	✓		Tape	

Item	QTY	PART NUMBER	DESCRIPTION
	-245		
	X	D407-667-245	CROSSTUBE ASSEMBLY (407 HIGH AFT)
1	1	D8011-115	CROSSTUBE
2	2	D2873-043	NUT PLATE
3	2	D2873-045	NUT PLATE
4	1	D2884-1	SUPPORT
5	2	D3180-1	CHAFING SHIELD
6	2	D3585-083-430	RUBBER CUSHION
7	14	MS20601AD4W8	RIVET (OR NAS802B 4-8)
8	4	MS21920-22	CLAMP
9	2	MS21920-25	CLAMP (OR MS21920-24)
10	AR	SCOTCH-WELD DP460	EPOXY ADHESIVE, 3M SCOTCH-WELD
11	AR	PROSEAL 880	SEALANT

GENERAL NOTES:

- 1) MATERIAL: MANUFACTURED FROM D8011-115
FINISHED LENGTH = 112.8130.020
- 2) FINISH: CHEMICAL CONVERSION COAT PER DART QSI 005 4.1
PRIME INSIDE AND OUTSIDE PER DART QSI 005 4.2
PAINT CROSSTUBE PER DART QSI 005 4.2
FOR HATCHED AREAS (ZN A6-3) MASK AS REQUIRED
TO APPLY PRIME AND APPLY CLEAR COAT ONLY
TOLERANCES ARE PER DART QSI 018 UNLESS OTHERWISE NOTED.
- 3) TOLERANCES ARE PER DART QSI 018 UNLESS OTHERWISE NOTED.
- 4) UNITS: INCHES UNLESS OTHERWISE NOTED.
- 5) BREAK SHARP EDGES: 0.005 TO 0.010 MAX.
- 6) IDENTIFICATION: SCRIBE DART PART NUMBER "D407-667-245" AND BATCH NUMBER ON INSIDE OF CLIFF USING VIBRATING STYLUS.
- 7) WEIGHT: 27.7 lbs
- 8) PART IS SYMMETRIC ABOUT CENTERLINE.
- 9) RUN-OFF PART. BLEND OUT EDGE LONGITUDINALLY. TRANSITION SHOULD BE SMOOTH. BENDING IS 8% BASED ON O.D.
- 10) BEND PROGRESSIVELY WITH A MINIMUM OF 8 PASSES. MAXIMUM TUBE FLATTENING DUE TO LIQUID PENETRANT INSPECT OUTSIDE SURFACE OF CROSSTUBE PER QSI 038.
- 11) INSTALL D2884-1 CENTER SUPPORT USING A 0.04" TO 0.07" THICK LAYER OF SCOTCH-WELD DP460 PER QSI 016. LET CURE FOR 24 HOURS AFTER INSTALLATION AND PRIOR TO PACKAGING.
- 12) INSTALL MS21920-25 CLAMPS WITH D3585-083-430 RUBBER CUSHIONS TO SECURE D2884-1 SUPPORT ON TOP SIDE OF THE CROSSTUBE. ENSURE CLAMPS ARE OPPOSITE CROSSTUBE SUPPORT.
- NOTE: MS21920-24 CLAMPS CAN BE USED TO ACCOMMODATE VARYING DIAMETERS. EXTREME CARE MUST BE TAKEN TO PROTECT THE OUTSIDE SURFACE OF THE TUBE. THE OUTSIDE SURFACE MUST BE SMOOTH AND FREE FROM SURFACE DEFECTS SUCH AS SCRATCHES, NICKS, OR DENTS. DEFECTS UP TO 0.005" MAY BE BLENDED OUT LONGITUDINALLY. CIRCUMFERENTIAL GRIND MARKS ARE UNACCEPTABLE.
- 13) APPLY A THIN COAT OF PROSEAL 880 ON INSIDE CONCAVE SURFACE OF D3180-1 CHAFING SHIELDS AND LET CURE PER MANUFACTURER'S INSTRUCTIONS. INSTALL PROSEAL D3180-1 CHAFING SHIELDS ONTO CROSSTUBE BY APPLYING A THIN COAT OF PROSEAL 880 ONTO CROSSTUBE. BE SURE TO ELIMINATE ANY AIR GAPS.
- 14) INSTALL D3180-1 CHAFING SHIELDS SO THAT OVERLAP IS 90 TO 70 DEGREES FROM BOTTOM OF CROSSTUBE OPPOSITE D2884-1 SUPPORT.
- 15) TORQUE CLAMPS 80 TO 100 IN-LB. TORQUE CLAMPS ON D3180-1 CHAFING SHIELD 40 TO 50 IN-LB. ENSURE AT LEAST 1.5 THREADS ARE SHOWING IN SAFETY AND THAT NUT HAS NOT BOTTOMED-OUT AFTER TORQUING. PRIOR TO PACKAGING, RE-CHECK TORQUE ON CLAMPS AFTER ADHESIVE HAS CURED FOR 24 HOURS.

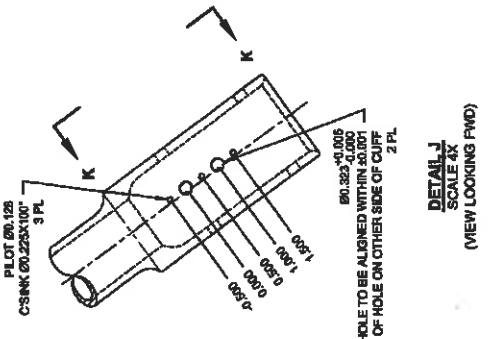
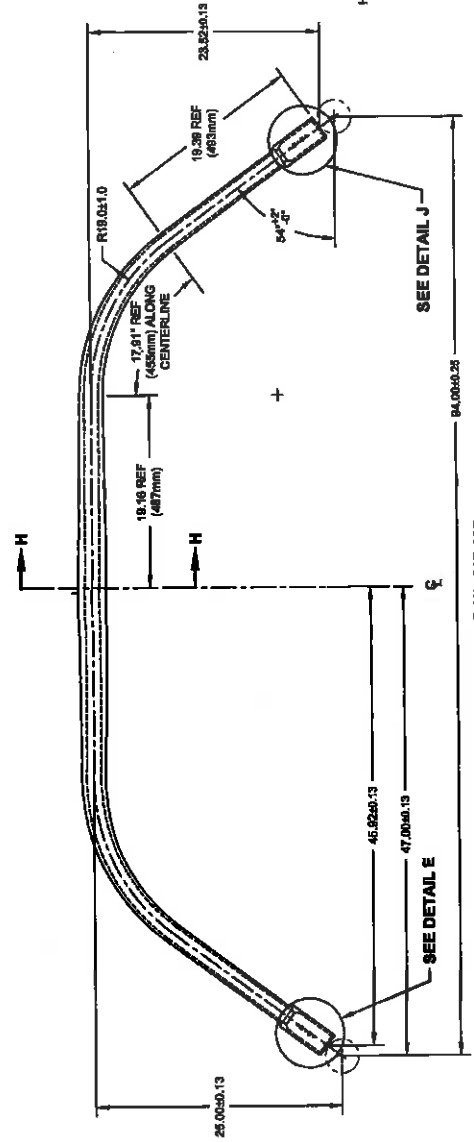
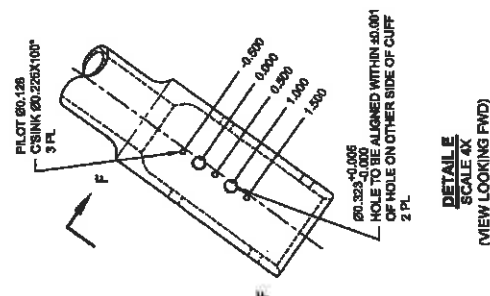
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RETURN TO
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UNCONTROLLED COPY
SUBJECT TO AMENDMENT
WITHOUT NOTICE
WORK ORDER
NO. 199412 MJS
140822

G	INCORP. DED'S D407-667-245-F1/F2 (ZN DB-1, AB-1, DS-2, BS-2, CS-2) WAS 3.53 (ZN DB-2); TORQUE REDUCED FOR CHAFING SHIELD (ZN AB-1); FINISH REVISED TO ALLOW MANUFAC. FLEXIBILITY (ZN CS-1)	RF	15.03.20
F	RELOCATED NOTES TO NEW STANDARDS (ZN BS-1); RELOCATED FLAG # 8 (ZN AB-3) PER NCR 210; REMOVED REF. & ADD TOLERANCES (ZN CS-3, CA-3 & DS-3)	RF	08.11.06
E	8.02 AND 8.53 WERE 8.40 AND 8.90 (ZN DS-2); REORGANIZED VIEWS AND REFORMATIZED DRAWING TO CURRENT STANDARDS. REASONS: CLAMPS MOVED 0.375 TOWARD CL. TO ELIMINATE INTERFERENCE WITH AIRCRAFT MOUNTS. REFERENCE: PARK98-21 AND ECRH1226	MB	08.07.26
D	ADD VIEW FOR OEM SKID HOLES. ROTATE ORIENTATION OF CLAMPS SECTION F.F. REMOVE .461 ABRASION STRIP, ADD MAGNIBOND 6398, ADD CUSHION	PH	07.02.07
C	ADD HOLES AND NUT PLATES FOR COMPATIBILITY WITH BHT/AA SKIDTUBES	PH	05.07.26
B	ADD CHAFING SHIELD	CP	03.05.21
A	NEW ISSUE	CP	02.05.13
REV.	DESCRIPTION	BY	DATE
DESIGN			
DRAWN	RF		
CHECKED	RF		
MFG. APPR.	RF		
APPROVED	RF		
DE APPR.	RF		
DATE	15.03.20		

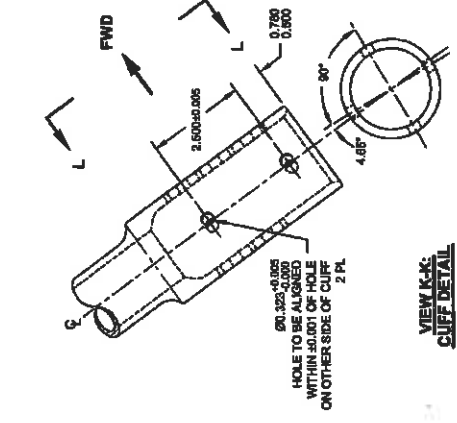
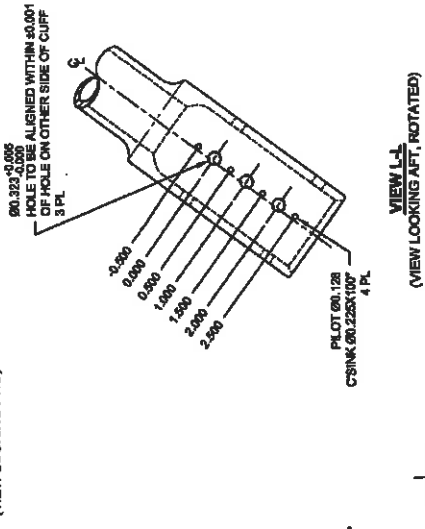
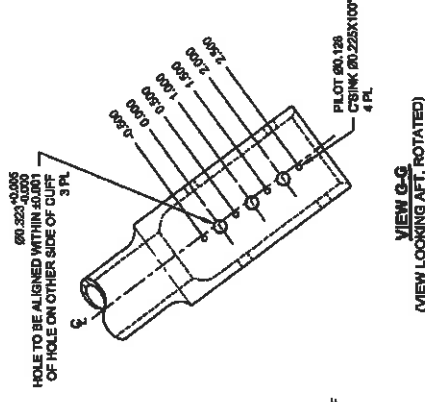
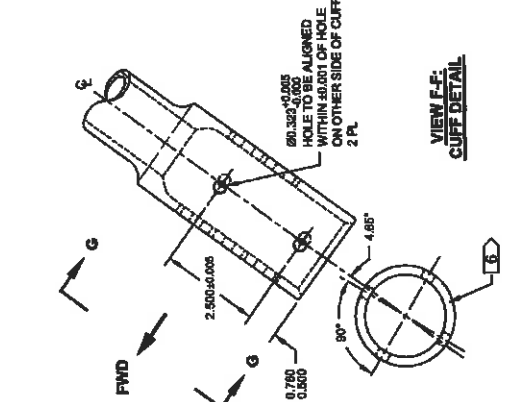
RELEASED

2015 APR 09
4/ 6:15 557

DART AEROSPACE LTD
HAWKSBURY, ONTARIO, CANADA
DRAWING NO. D407-667-245
SHEET 1 OF 4
TITLE CROSSTUBE ASSY (407 HIGH AFT)
SCALE NTS



D407-887-805
BENDING AND DRILLING DETAIL
(VIEW LOOKING FWD)



RELEASED
2015 APR 09

DESIGN	REV. G
DRAWN	DART AEROSPACE LTD
CHECKED	HAWKESBURY, ONTARIO, CANADA
MFG. APPR.	DRAWING NO. D407-887-245
APPROVED	SHEET 3 OF 4
DE APPR.	TITLE CROSSTUBE ASSY (407 HIGH AFT)
DATE	15.03.20
	SCALE NTS

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Entered: _____ Date: _____

WORK ORDER NON-CONFORMANCE / ROUTE UPDATE

Route update only

NCR No. _____

DISPOSITION		DEPARTMENT/PROCESS			
Job: _____	Rework ☐	Skid-tube ☐	Cross tube ☐	Eng. (Non-AW) ☐	Engineering ☐
Part No. _____	Scrap ☐	Machining ☐	Small Fab ☐	Prod. Eng. Coord. ☐	Water Jet ☐
	Use-as-is ☐	Large Fab ☐	Finishing ☐	Rec/Store/Packaging ☐	Supplier ☐
					Quality ☐
Date: _____	Sequence #: _____	QTY Affected: _____		MRB (QS1042) _____	
Description Work Order Deviation		Disposition			
Root Cause		FAULT CATEGORY			
Operator ☐	Pressure/Forced ☐	Contamination ☐	Power Loss/Surge ☐	Positioned Wrong ☐	
Manufacturing Process ☐	Bending ☐	Misaligned/off center ☐	Folio/Program ☐	Outside Tolerance ☐	
Equip/Tooling ☐	Crushing ☐	BOM/Route ☐	Grain Direction ☐	Drawing ☐	
Handling/Preservation ☐	Cracks ☐	Broken/Damage/Defect ☐	Weld ☐	Finish ☐	
Material ☐	Crimp/Kink/Ripple/Wave/Twist ☐	Incomplete/Unclear Instructions ☐	Wrong Stock Pulled ☐	Part Lost/Missing ☐	
Product Improvement ☐	Marks/Chatter ☐	Drill Holes ☐	Out of Sequence ☐	Misread ☐	
Process Improvement ☐	Mislabeled ☐	Fit/Function ☐	Off-set/Set-up ☐		
Human Factors ☐	Other/Details: _____				
		Completed By _____			
		Lead hand / Supervisor _____			
		QC / QA Coordinator _____			